

What is claimed is:

1. A friction stir welding method, characterized in that:  
an end portion in the width direction of a first hollow shape member is abutted against an end portion in the width direction of a second hollow shape member;

the first hollow shape member comprises two face plates; a first connecting plate for connecting the two plates, at least one end of which is connected to a region other than said end portion; a second connecting plate for connecting said end portions of said face plates that is disposed substantially orthogonal to said face plates; recessed portions formed respectively to connecting portions where said two face plates are each connected with said second connecting plate, each recessed portion opening outward toward both the width direction and the thickness direction of the hollow shape member; a groove or projection formed to one recessed portion; and a groove or projection formed to the other recessed portion;

the second hollow shape member comprises two face plates; a first connecting plate for connecting the two plates, at least one end of which is connected to a region other than said end portion; a projection or groove formed to one face plate at said end portion of said hollow member; and a projection or groove formed to the other face plate at said end portion of said hollow member;

said projections are each inserted to a corresponding groove, respectively, when said two hollow members are abutted against

each other, at which time one hollow shape member is inserted to the other hollow shape member so as to substantially suppress movement of said hollow shape member in the thickness direction; and

a rotary tool is disposed on the extension of plate thickness of said second connecting plate, thereby friction stir welding said abutted region from the outer direction of thickness of said hollow shape members.

2. A friction stir welding method according to claim 1, wherein said friction stir welding is performed to weld said abutted region, and said grooves and said projections, respectively.

3. A friction stir welding method, characterized in that:  
an end portion in the width direction of a first hollow shape member is abutted against an end portion in the width direction of a second hollow shape member;

the first hollow shape member comprises two face plates; a first connecting plate for connecting the two plates, at least one end of which is connected to a region other than said end portion; a second connecting plate for connecting said end portions of said face plates that is disposed substantially orthogonal to said face plates; recessed portions formed respectively to connecting portions where said two face plates are each connected with said second connecting plate, each

recessed portion opening outward toward both the width direction and ~~ard~~ the thickness direction of the hollow shape member; a groove or projection formed to one recessed portion; and a groove or projection formed to the other recessed portion;

the second hollow shape member comprises two face plates; a first connecting plate for connecting the two plates, at least one end of which is connected to a region other than said end portion; one face plate having at the end portion of said hollow shape member either a projection protruding outward to the width direction of said hollow shape member or a groove opening outward to said direction; and the other face plate having at the end portion of said hollow shape member either a projection protruding outward to the width direction of said hollow shape member or a groove opening outward to said direction;

said projections are each inserted to a corresponding groove, respectively, when said two hollow shape members are abutted against each other; and

a rotary tool is disposed on the extension of plate thickness of said second connecting plate, thereby friction stir welding said abutted region from the outer direction of thickness of said hollow shape members.

4. A friction stir welding method as described in claim 1, wherein said friction stir welding is performed to weld said abutted regions, and said grooves and said projections, respectively.

5. A friction stir welding method according to claim 4, wherein said groove and said projection is disposed within the range of diameter of a small-diameter portion of said rotary tool being inserted to said hollow shape members upon performing the friction stir welding.

6. A friction stir welding method according to claim 5, wherein the central axis of said rotary tool is disposed within the range of depth of said groove upon performing the friction stir welding.

7. A friction stir welding method according to claim 4, wherein the central axis of said rotary tool is disposed within the range of depth of said groove upon performing the friction stir welding.

8. A friction stir welding method according to claim 3, wherein

grooves are formed to the recessed portions of said first hollow shape member as said grooves or projections; and

projections are formed to the two face plates of said second hollow shape member as said grooves or projections.

9. A friction stir welding method, characterized in that:  
an end portion in the width direction of a first hollow

shape member is abutted against an end portion in the width direction of a second hollow shape member;

said first hollow shape member comprises two face plates, said two face plates each having either a groove opening toward the width direction or a projection protruding toward the width direction, formed at one width-direction-end of said first hollow shape member;

said second hollow shape member comprises two face plates, said two face plates each having either a projection protruding toward the width direction or a groove opening toward the width direction, formed at one width-direction-end of said second hollow shape member;

said projections are each inserted to a corresponding groove, respectively, when said two hollow members are abutted against each other; and

said friction stir welding is performed to weld said abutted regions, and said grooves and said projections.

10. A friction stir welding method according to claim 9, wherein said groove and said projection is disposed within the range of diameter of a small-diameter portion of said rotary tool being inserted to said hollow shape member upon performing the friction stir welding.

11. A friction stir welding method according to claim 10, wherein the central axis of said rotary tool is disposed within

the range of depth of said groove upon performing the friction stir welding.

12. A friction stir welding method according to claim 9, wherein the central axis of said rotary tool is disposed within the range of depth of said groove upon performing the friction stir welding.

13. A hollow shape member for friction stir welding, comprising:

two face plates;

a first connecting plate for connecting said two face plates, at least one end of which is connected to a region other than an end portion in the width direction of the hollow shape member;

a second connecting plate for connecting said end portions of said two face plates, disposed substantially orthogonal to said face plates;

recessed portions provided respectively to each of the two connecting portions where said two face plates are connected with said second connecting plate, each recessed portion opening outward toward both the width direction and the thickness direction of said hollow shape member; and

either grooves opening toward the outer direction of width or projections protruding toward the outer direction of width formed to said recessed portions, respectively.

14. A hollow shape member for friction stir welding according to claim 13, wherein said grooves or said projections are disposed on the extension of plate thickness of said first connecting plate.

15. A hollow shape member for friction stir welding according to claim 13, wherein said grooves or said projections are disposed on the extension of substantially the center of plate thickness of said second connecting plate.

16. A hollow shape member for friction stir welding according to claim 13, wherein either the center of depth of said grooves or the center of protruded height of said projections is disposed on the extension of substantially the center of plate thickness of said second connecting plate.

17. A hollow shape member for friction stir welding according to claim 13, wherein:

second projections are provided to the end portion with said recessed portion of a first face plate and to the end portion with said recessed portion of a second face plate, respectively, each second projection protruding outward to the thickness direction; and

a portion of said grooves or a portion of said projections is disposed within the range of protruded height of each second projection, respectively.

18. A hollow shape member for friction stir welding according to claim 13, wherein said recessed portions are provided with said grooves, respectively, as said grooves or projections.

19. A hollow shape member for friction stir welding according to claim 13, wherein said recessed portions are provided with said projections, respectively, as said grooves or projections.

20. A hollow shape member for friction stir welding, comprising:

two face plates;

a connecting plate for connecting said two face plates, at least one end of which is connected to a position other than an end portion in the width direction of the hollow shape member;

either a projection protruding toward or a groove opening toward the outer direction of width of said hollow shape member, provided to the end of a first face plate at said end portion in the width direction of said hollow shape member; and

either a projection protruding toward or a groove opening toward the outer direction of width of said hollow shape member, provided to the end of a second face plate at said end portion in the width direction of said hollow shape member.

21. A hollow shape member for friction stir welding according to claim 20, wherein the end portions of said first and second face plates are provided with projections, respectively, as said projections or grooves.

22. A hollow shape member for friction stir welding according to claim 20, wherein the end portions of said first and second face plates are provided with grooves, respectively, as said projections or grooves.

23. A hollow shape member for friction stir welding according to claim 20, wherein:

second projections are provided to the end portions of the first and second face plates having said projections or said grooves, respectively, both second projections protruding outward to the thickness direction; and

a portion of said projections or said grooves is disposed within the range of protruded height of said second projections, respectively.

24. A hollow shape member for friction stir welding according to claim 20, wherein the end portions of said first and second face plates having said projections or said grooves respectively are substantially disposed at the same position in the width direction of said hollow shape member.